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The Journal of Milk and Food Technology (including Milk and Food Sanitation) is issued monthly beginning with the January number. Each volume comprises 12 numbers. Published by the International Association of Milk and Food Sanitarians, Inc., with executive offices of the Association, Blue Ridge Rd., P. O. Box 437, Shelbyville, Ind.

Entered as second class matter at the Post Office at Shelbyville, Ind., March 1952, under the Act of March 3, 1879.

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Journal of

MILK and FOOD TECHNOLOGY

INCLUDING MILK AND FOOD SANITATION AND MILK TECHNOLOGY

Official Publication

International Association of Milk and Food Sanitarians, Inc.

REG. U.S. PAT. OFF.

Vol. 21 December No. 12

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Subscription Rates: One volume per year
Individual non-members, Governmental and Commercial Organization subscription, 1 yr. $6.00
Public and Educational Libraries, 1 yr. $4.00
Single Copies $1.00

Orders for Reprints: All orders for reprints should be sent to the executive office of the Association, P. O. Box 437, Shelbyville, Ind.

Membership Dues: Membership in the International Association of Milk and Food Sanitarians, Inc., is $5.00 per year, which includes annual subscription to the Journal of Milk and Food Technology, (including Milk and Food Sanitation). All correspondence regarding membership, remittances for dues, failure to receive copies of the Journal, changes of address, and other such matters should be addressed to the Executive Secretary of the Association, H. L. Thomasson, Box 437, Shelbyville, Indiana.

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OUR READINESS AND RESPONSIBILITY FOR PROFESSIONAL STATUS[1]

EMIL T. CHANLETT
School of Public Health
University of North Carolina, Chapel Hill

The distinguishing characteristics of a profession is the ability to solve problems involving the public interest by application of unique skills. This statement points to three factors of importance and concern, public interest, problem solving ability, and unique skills.

Brief thought of the characteristics of established professional groups clarifies their position in our society. Those of medicine, dentistry and nursing owe their place to the very personal manipulation of our bodies and function in what are literally life and death decisions. Architecture and engineering are at least once removed from that close relation. But, there are matters involving public and personal safety. Law presents a different relation. It is an issue of trust and confidence in the delicate unravelling of personal relations which have become twisted and knotted either between individuals or between an individual and society. All engage in relatively complex matters which pose problems requiring an intellectual mastery of a body of fundamental knowledge, and its application to living entities.

What is our state of readiness in these matters? Have we established the concept of a trust in the public mind? Have we defined the uniqueness of our skills? Do we go about our tasks armed with a problem solving attitude?

What answers can we bring to these questions? The three are strongly inter-related. In full candor we will have to say "essentially negative." We can cite many splendid examples and achievements which point the way to strong affirmatives.

The people we serve, those who benefit from our daily work and with whom we deal through direct service, would upon reflection grant that in many instances their health is in our hands. Furthermore, in just as many cases, so are their pocketbooks. But this would be only upon reflection. This bespeaks a lack of consciousness of the sanitarian's contribution to the community's health. We must seek devices to sharpen public awareness of the sanitarian's professional contributions.

Within our own circles we have not made sufficiently clear our claims to unique skills. Time and again one hears the words, "Just what is a sanitarian? Someone give me a definition." To encourage others and discourage no one, here is one - - "The guardian of our air, our food, our water, and our shelter, who, by his observations and tests of these, initiates action to protect the community from disabilities and to promote its well being. His skill is observation and test. His aptitude is interpretation of his analysis to mobilize his professional colleagues and fellow citizens to correct and to create a physical environment which makes life better."

A large deterrent from the employment of a problem solving approach in sanitation activities is adherence to inspectional routines epitomized by field forms that are filled out in door to door visits in accordance with the calendar and administrative dicta, local or remote. This is the apex of layers of laws, regulations, codes, operational manuals, and inspection sheets. The system is based upon two assumptions: (a) if you watch them close enough, there will be no slips, and (b) the sanitarian is at his best as a "gumshoe", a flat-foot pounding a prescribed beat with his imagination limited and his solutions in the fine print in the code or manual.

A larger deterrent is a sanitarian's acceptance of this non-professional rote. It is the antithesis of observation, analysis, evaluation, marshalling of resources, and mobilization of these for action. The latter process has the stamp of professional undertaking. Surveillance on all fronts must give way to calculated concentration on problems that are accorded a priority among the community's environmental health needs. The process of priority implies selection, which in turn rests upon judgment schooled by the mastery of scientific principles. Such judgment is brought to bear upon facts gathered and sieved by objective procedures. Altogether it is a professional process, emerging from the education and experience of the individual practitioner.

Education and organization are necessary for achieving the delineation of the professional process for carrying out the sanitarian's responsibilities. Each individual has the task of raising his level of knowledge and his capacity to think to the maximum of his endowments. Formal education at its best is designed to achieve these ends with the greatest effectiveness. But it can only provide the foundation for a continuing process. Organizations built about our occupational pursuits are at their best when these provide

[1]Presented at a meeting of the Tennessee Association of Sanitarians, Affiliate of International Association of Milk and Food Sanitarians, October 1, 1958, Nashville, Tennessee.

the stimulus, the goals, and the opportunities for growth in "on-the-job" effectiveness. From an organization there comes forth a priceless product – leadership. The good work and the high aspiration of the emergent leaders become the pattern and the identity of the group.

People who have sought to define an educational path to professional status for sanitarians have faced the fact that there is no single entrance clearly marked. The nature of this difference becomes more marked when one considers the accepted traditional educational patterns leading to the profession of law, medicine, nursing, engineering, veterinary medicine, and dentistry. The criteria which may be found in job descriptions, civil service classifications, qualification statements from our national organizations, and statements in the rules governing registration boards, have shown distinct advancement during the last decade. These have now essentially come to the point of requiring graduation from college with a defined number of courses in the basic natural sciences. Compared to other professional groups, these requirements are scant. But more significant is the lack of a cohesive discipline molding to some common pattern the mastery and exercise of a body of scientific knowledge (*1*).

In spite of this evident lack, no satisfactory alternate is at hand. Some point to the possibility of the development of sanitary science education at the undergraduate level embodied in such degree titles as Bachelor of Science in Sanitation or Bachelor of Sanitary Science. Others would move forward to the master's level, reserving the professional status as sanitarian to those who have completed a year of graduate work. The numbers who have emerged from such educational experience are few compared to the total sanitation personnel with our state and local health organizations, and with private industry and the armed forces. Although at the moment it may seem that such notions are scarcely worth consideration, their mere existence requires that those of us concerned with the professional status of sanitarians give them thoughtful study and that we be prepared to enter into discussions of them well informed.

Educational criteria do not stop with the definition of formal education. Clearly, experience and knowledge acquired by self-study can contribute enormously to a man's capacity. While embracing this concept wholeheartedly, it should also be recognized that experience becomes more meaningful when it occurs upon a foundation of understanding of the scientific principles which are governing the phenomena under observation. A word must also be spoken concerning a qualifying examination. Indeed, it can be a fair measure of one's possession of technical content, and by ingenious questioning, reveal the capacity to bring such knowledge to bear on particular problems. Furthermore, an examination compels a beforehand preparation and study. Nevertheless, it alone cannot be a full measure of the sanitarian's ability which depends so heavily on his capacities to establish personal relations, through which he brings about a change in the behavior of the persons with whom he is working. In spite of the lack of uniform devices for measuring such abilities, they must be given full weight in an estimate of a man's professional stature.

Organizations are the means through which professions gain strength and cohesion. Policies and standards creating and governing professions are forged in hard committee sessions where diverse viewpoints are harmonized, and if need be, compromised. These become the point of referral as external relations require a definition of the body and soul of the profession.

This points directly to the most important role of professional organizations in public relations. This is the task of interpreting the function of the profession. The organization's activities and statements become the embodiment of the ideals of the group. These form the face by which the people recognize the profession.

For sanitarians, who are in the main governmental employees, organization has the further value of presenting to the governmental hierarchy our needs, our gripes, and our successes. The individual is at considerable disadvantage in attempting to carry his own case and cause to the higher authorities. Through an organization, matters of status and interest may be brought before the higher echelons with grace and dignity, and without the stigma of insubordination and the risk of punitive actions by resentful superiors. For sanitarians, this is all the more needful when one considers the path which must be threaded through a maze of elected and appointed officials, physicians, engineers, and veterinarians with whom the lines of communication and relationship are not always clear, and at times quite unsatisfactory.

This group is well under way toward these goals of education and organization. You are the ones who have chosen to spearhead the unfinished work ahead. The needs of our sanitarian organization are twofold. One is that of individual participation, which means paying dues, serving willingly upon committees, reading the journals and publications of the organization, attending its meetings, and particularly, that of giving careful thought to the election of the officers of the organization. Our second need concerns the over-all relationships of our national organizations. It is that of seeking and being prepared to move toward unification. In this matter there are hopeful signs that our

two major sanitarian associations in the country may join forces. In this, we rest our trust in the thought that in union there is strength.

A profession is created by its practitioners (*2*). Organizational devices, certainly, are helpful and absolutely necessary. But these can be no better than its leadership and its membership. Laws and regulations, registration boards, and certification plans will not of themselves create a profession. Indeed, if such action is taken without great care and preparation, the results may be an ill-conceived plan which may kill the opportunity for the creation of a true professional status.

The business of the creation of professional status is a task which belongs to each and every one of us who would cherish the title, sanitarian, holding it in the high esteem in which it was born at the turn of the 20th century. Then it was claimed by engineers, physicians, and scientists alike who had banded together to lay the foundations for the scientific study of the hygiene of our environment. The execution of this task by each of us may be defined simply. It is required that you advance your knowledge; that you seize every opportunity to master the science which is behind the rules and regulations; that you fix your judgment by the most scientific objective analysis of which you are capable; that you go about your daily responsibilities governed by the highest ideals of personal integrity; that you follow the Golden Rule in your relations with others; that you give selfless participation in sanitarian organizations and associations; and that you contribute to the development of sanitation practices to make these unique by means of ingenious thought or by dogged efforts as your endowments permit. These, and no less, are our responsibilities. Achievement of these will be a measure of our readiness. When ever a relatively small number of us are able to meet these challenges, we will find our colleagues in public health, and the people whom we serve most ready to recognize our professional worth.

REFERENCES

1. Chanlett, Emil T. What Makes a Profession?. The Sanitarian, 20:286. 1958.

2. Reed, Lowell, Some Aspects of Multidisciplinary Professions. Am. J. Public Health, 84: 1. 1958.

1957 SUMMARY OF DISEASE OUTBREAKS[1]

CARL C. DAUER, M.D.[2]

The number of disease outbreaks reported in 1957 for which either water or food was the vehicle of infection was essentially the same as in the past few years (table 1). The number of outbreaks reported by the various States apparently bore no direct relationship to the size of their populations but reflected the extent of activities in investigating epidemic occurrences. The number for a few States was relatively large because of the inclusion of outbreaks occurring on military installations located within their borders.

The method used to tabulate outbreaks was changed slightly from that used in previous summaries. Only those outbreaks with laboratory confirmation of a specific type of food poisoning or food infection were placed in definite categories such as salmonellosis, shigellosis, or staphylococcal food poisoning (table 2). Those without such confirmation were classed as gastroenteritis, etiology unknown. This change accounts largely for the sizable reduction of outbreaks attributed to staphylococcal food poisoning, approximately 50 percent compared with the years 1955 and 1956, when many outbreaks were classified according to clinical and epidemiological findings.

In addition to the usual method of tabulating the number of various types of outbreaks by States, each of the principal types of foodborne outbreaks was tabulated by kind of food involved and by either the place of occurrence or the source of food. As shown in table 3, poultry and other meats were associated with a large proportion of these occurrences. It is also apparent that a large proportion occurred in groups of persons eating in public establishments and in private homes. However, the average number of persons per outbreak was relatively small as compared with the number in outbreaks occurring in schools or institutions and at social gatherings such as picnics and church gatherings.

No improvements in food-handling practices are apparent. Lack of refrigeration, exposure at room temperatures, or handling of food by persons with infections were mentioned frequently as contributing to or as the direct cause of the outbreak.

WATERBORNE OUTBREAKS

Comparatively few outbreaks occurred in 1957 for which water was demonstrated to be the vehicle of infection. In one instance, two persons with typhoid fever had used water from a dug well which presumably was contaminated by a chronic carrier who lived nearby. Gastroenteritis of unknown etiology occurred in two groups of individuals using water from wells that showed evidence of fecal contamination. One small group of cases of gastroenteritis occurred among passengers on an airplane. Inspection of the plane's drinking water supply suggested that it was the probable source of the illness.

MILKBORNE OUTBREAKS

Market milk was not reported as the source of infection in any outbreak of disease in 1957. However, two cases of brucellosis were found in one family in which raw milk had been used for a period of about 2 years. A case of Q fever was found in an individual who consumed raw milk during a milk strike. Some of the cows in the dairy supplying the milk were shown by laboratory tests to be infected with Q fever.

Milk products, mainly ice cream, were vehicles of infection in six outbreaks. Three of the five involving ice cream were caused by *Salmonella*. Since raw eggs were used in preparing the ice cream in two of these outbreaks, it is possible that they were the primary source of infection. In one instance, cream cheese served in a restaurant was thought to be the probable source of infection for a small group of persons with gastroenteritis.

TYPHOID FEVER

Only four outbreaks of typhoid fever were reported in which either food or water was definitely incriminated. Two cases occurred among workmen of a small factory supplied with drinking water from a dug well. The well probably was contaminated from a nearby cesspool receiving the stools of a known carrier. An explosive outbreak totaling 38 confirmed and 27 suspect cases of typhoid fever occurred in an institution. The outbreak was considered to be foodborne since the water supply was found satisfactory in every respect. One of the persons living in the institution was found to be a carrier. It was determined that she carried the same phage type (E_1) organism that was found in a number of the cases. In another outbreak of 17 cases, 14 were confirmed by isolation of phage type (E_1) organism. All of the patients were members of the 7th grade of a public school. The manager of the cafeteria in the school was found to

[1]Reprinted from *Public Health Reports*, 73:681-686.1958

[2]Dr. Dauer is medical adviser to the chief of the National Office of Vital Statistics, Public Health Service.

TABLE 1 — FOODBORNE AND WATERBORNE DISEASE OUTBREAKS REPORTED IN 1957, BY VEHICLE OF INFECTION

Area	Water		Milk and milk products[a]		Other foods[a]	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
United States	4	131	8	67	250	11,085
New England:						
Maine					5	49
Massachusetts					7	383
Rhode Island					3	66
Connecticut	1	25			3	38
Middle Atlantic:						
New York	1	2	1	5	18	936
New Jersey			1	1	5	424
Pennsylvania					1	17
East North Central:						
Ohio					2	42
Indiana					2	338
Illinois	1	100	1	16	14	317
Michigan					2	104
Wisconsin					3	115
West North Central:						
Minnesota					4	109
Iowa					2	20
Missouri					3	279
North Dakota					1	32
Nebraska					5	1,394
South Atlantic:						
Maryland					12	1,034
Virginia					6	237
West Virginia					1	100
North Carolina			1	6	3	177
South Carolina					2	75
Georgia					3	135
Florida					2	55
East South Central:						
Kentucky			1	2	5	60
Tennessee			1	19	4	233
Alabama					2	222
West South Central:						
Arkansas			1	16	2	36
Louisiana					5	1,232
Mountain:						
Wyoming					1	4
Colorado	1	4			1	1
New Mexico					2	12
Arizona					2	165
Pacific:						
Washington					5	88
Oregon					4	137
California			1	2	106	2,404
Hawaii					1	6
Not Known					1	9
United States 1956	9	1,719	31	873	210	11,133
United States 1955	2	22	3	302	193	9,633

[a] Includes outbreaks among military personnel.

be a carrier and is presumed to be the source of infection, but the mode of contamination or the specific food involved was not determined. In another instance of 13 cases all of the patients had eaten in a restaurant where a carrier, not previously known, was employed as a busboy.

A group of three cases, not included in the tables, occurred in preschool children living in the same apartment building. A known carrier lived in this building, and another lived in another part of the housing development, but neither had any known contact with the children. The organisms recovered from the first carrier and the children were all shown to be phage type E_1. Overflow of sewage from the building into the basement was pumped out on a lawn used by the children as a play area. It is possible that the children were infected on the playground. In another area, floods occurring in late spring washed out sewer mains and covered the sewage treatment plant of a large city. Seven cases are believed to have resulted directly or indirectly from this interruption of sewage disposal. One case in the same city was considered to have resulted from a fall into the river when it was highly polluted with sewage.

SALMONELLOSIS

Thirty outbreaks of salmonellosis were reported in 1957, all of which were confirmed by recovery of organisms either from the stools of those who were ill, from food handlers, or from specimens of food. In six of the outbreaks, poultry meat — usually turkey —was eaten. A comparatively large number of the outbreaks occurred in homes. The smallest consisted of 3 cases and the largest of 70 cases following a wedding reception at which turkey was served. One large outbreak occurred simultaneously among persons attending dinners in several churches of one community. The food served by a single caterer from another State was transported about 400 miles in this outbreak.

Fifteen types of *Salmonella* organisms were isolated in the 30 outbreaks. Among the types recovered were *S. typhimurium* in 11, *S. newport* in 4, *S. montevideo* and *S. tennessee* in 2 each. In one outbreak 2 types, *S. give* and *S. sandiego*, were recovered; in another, 3 types, *S. barielly*, *S. montevideo*, and *S. reading*.

Early in 1957 it was noticed that an unusual number of *S. reading* infections were occurring. A sharp rise in the number began in September 1956 and reached a peak of 71 cases in February 1957. Infections were identified almost simultaneously in several widely separated areas of the country. During the 12-month period beginning in September 1956, there were 325 acute, sporadic cases and 3 outbreaks due to this type of organism. Previously *S. reading* was very rarely identified among the *Salmonella* isolates from human or animal infections occurring in the United States. Of the cases reported, 70 percent were in children 6 years of age or under and 18 percent in children under 1 year. The epidemiological picture strongly suggested a widely distributed common source of infection, but despite intensive investigation by means of detailed food histories, no common vehicle was identified.

TABLE 2 — FOODBORNE, WATERBORNE, AND OTHER DISEASE OUTBREAKS REPORTED IN 1957, BY TYPE OF INFECTION

Area	Typhoid fever		Salmonellosis [a]		Shigellosis		Trichinosis		Botulism		Staphylococcal food poisoning [a]		Streptococcal infections		Gastroenteritis, etiology unknown [a]		Toxic agents	
	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases	Outbreaks	Cases
United States	4	70	30	1,607	11	754	1	14	6	12	58	1,660	4	1,030	135	6,065	8	68
New England:																		
Maine			2	8							2	26			1	15		
Massachusetts											2	110			5	273		
Rhode Island											2	34			1	32		
Connecticut											3	38			1	25		
Middle Atlantic:																		
New York	1	2	2	132	1	200	1	4			6	124			7	478	2	3
New Jersey			1	176					1	1					3	247		
Pennsylvania	1	17																
East North Central:																		
Ohio			1	12														
Indiana	1	38											1	300				
Illinois			1	7							4	67			11	359		
Michigan											1	85			1	19		
Wisconsin															3	115		
West North Central:																		
Minnesota			1	45	1	11					1	10			1	43		
Iowa											1	3			1	17		
Missouri											3	279						
North Dakota															1	32		
Nebraska															5	1,394		
South Atlantic:																		
Maryland			1	20					1	2	2	52	1	600	7	360		
Virginia					2	90									3	131	1	16
West Virginia													1	100				
North Carolina			2	20							1	150			1	13		
South Carolina			1	39											1	36		
Georgia											1	66			2	69		
Florida					1	50									1	5		
East South Central:																		
Kentucky											2	13			4	49		
Tennessee			1	19							1	69			3	164		
Alabama					1	192									1	30		
West South Central:																		
Arkansas			1	16											2	36		
Louisiana			1	423											3	806	1	3
Mountain:																		
Wyoming							1	4										
Colorado									1	1					1	4		
New Mexico			1	11					1	1								
Arizona											2	165						
Pacific:																		
Washington					1	41			1	5	1	3			2	39		
Oregon											1	3			3	134		
California	1	13	14	679	4	170			1	2	21	354	1	30	60	1,140	3	16
Hawaii							1	6										
Unknown											1	9						
United States 1956	7	25	23	1,999	8	1,107	11	98	11	22	111	4,313			88	6,688	9	160
United States 1955	5	36	16	971	10	475	5	92	5	14	102	4,130			66	5,160	5	99

[a] Includes outbreaks among military personnel.

TABLE 3 — OUTBREAKS OF CERTAIN FOODBORNE DISEASES REPORTED IN 1957, BY TYPE AND SOURCE OF FOOD

Source	Salmonellosis		Shigellosis		Staphylococcal food poisoning		Streptococcal infections		Gastroenteritis, etiology unknown	
	Number of outbreaks	Number of persons affected	Number of outbreaks	Number of persons affected	Number of outbreaks	Number of persons affected	Number of outbreaks	Number of persons affected	Number of outbreaks	Number of persons affected
Type of food										
Poultry	6	464	1	50	10	340	1	30	18	1,188
Other meat	2	21	1	3	21	519	0	.....	41	1,496
Custard-filled dessert	2	23	0	.....	10	167	0	.....	12	186
Salad	3	105	1	192	2	36	2	900	7	456
Other	7	135	1	12	10	231	1	100	12	106
Not determined	10	859	7	497	5	367	0	.....	42	2,503
Total	30	1,607	11	754	58	1.660	4	1,030	132	5,935
Source of food										
Public eating establishments	5	274	3	73	10	111	0	.....	39	421
Private clubs	5	498	0	.....	4	147	1	100	5	179
Schools	0	.....	2	289	5	158	0	.....	8	897
Colleges	0	.....	1	79	1	7	0	.....	3	617
Hospitals and institutions	3	38	2	91	2	41	0	.....	3	700
Recreation camps	0	.....	0	.....	2	96	0	.....	4	184
Labor camps	0	.....	0	.....	3	161	0	.....	7	213
Social gatherings	2	508	0	.....	7	337	3	930	11	1,230
Bakery caterers	1	3	0	.....	11	111	0	.....	5	97
Private homes	12	233	2	22	9	63	0	.....	23	181
Transportation	1	14	0	.....	0	.....	0	.....	3	89
Other	1	39	1	200	4	428	0	.....	21	1,127
Total	30	1,607	11	754	58	1.660	4	1,030	132	5.935

SHIGELLOSIS

Eleven outbreaks of shigellosis were reported in 1957. Water was not regarded as the vehicle in any of them. As shown in table 3, three of them involved eating in public eating places, two occurred in institutions, and two in schools. The food involved in transmission of the infection was not determined in 7 of the 11 outbreaks. *Shigella sonnei* was recovered in 2 outbreaks, *Shigella flexneri* in 4, and the species not stated in the remaining 5.

TRICHINOSIS

Three relatively small outbreaks of trichinosis were reported in 1957. In one family outbreak comprising 4 cases, sausage or chopped beef that may have been contaminated in a meat grinder was the probable source of infection. Four other cases, proved by biopsy, followed consumption of homemade garlic sausage. Consumption of raw pork and liver preceded acute trichinosis in 6 patients, 3 of whom died. Numerous trichina larve were found at autopsy of two and by muscle biopsy in others. Calcified cysts indicating previous infestations were found in some of the specimens. Specimens from a slaughtered pig also showed numerous trichina larvae.

BOTULISM

Six separate reports of botulism afflicting 12 persons were reported in 1957. Home-canned foods had been eaten in each instance. These included a gluten preparation, sausage, mushrooms, stringbeans, corn, and tuna fish. The type of infection was reported in only one instance, type A botulinus toxin being found in the tuna fish. Four of the 12 persons with botulism died.

STAPHYLOCOCCAL FOOD POISONING

Most of the 58 outbreaks of staphylococcal food poisoning reported occurred in groups of persons who had eaten in public establishments or in private homes, or had consumed food obtained from bakeries and caterers. Poultry and other meats were most commonly associated with these outbreaks. Eclairs and custard-filled cakes and pies were proved by laboratory tests to be the vehicle of infection in only 10 outbreaks. These types of food were suspected in 12 additional episodes, but the cases were tabulated as gastroenteritis, etiology unknown, because laboratory confirmation was not obtained.

STREPTOCOCCAL INFECTIONS

Four relatively large epidemics of streptococcal infection were traced to food eaten at social gatherings. In one instance, it was estimated that about two-thirds of the 900 who attended a charity luncheon became ill with septic sore throat. Egg salad served at the luncheon was considered to be the vehicle of infection. In another epidemic which occurred among those at-

tending a social, the potato salad was found to contain large numbers of streptococci. Symptoms of gastroenteritis characterized the illness. Thirty persons became ill with cramps and diarrhea following a church picnic where chicken salad was served. This food contained streptococci. Following a school picnic in another area, large numbers of streptococci were found in meat loaf, potato salad, and coleslaw served to the children, 100 of whom developed gastroenteritis.

GASTROENTERITIS, ETIOLOGY UNKNOWN

The number of reported outbreaks with unknown etiology constituted more than half of the total of foodborne and waterborne outbreaks. In about 45 percent of them, poultry and other meats were considered the vehicles of infection. About the same percentage occurred in persons eating in public eating establishments and in private homes. In most of the 132 foodborne outbreaks, investigators were unable to obtain specimens of food for laboratory testing. In a small number, specimens were obtained but showed none of the organisms usually associated etiologically with food infection or food poisoning.

CHEMICAL POISONING AND NOXIOUS FOODS

In one of the four reports of chemical poisoning, 3 persons showed clinical signs of acute lead poisoning. They had cramps and diarrhea and complained of a metallic taste after eating duck meat. The ducks had been shot and stored in a freezer for 2 months. A laboratory test showed the presence of lead in leftover portions of the duck meat. In another outbreak, lemonade prepared in a cadmium-lined can produced illness in every person who drank it at a school picnic. The lemonade contained 62.7 ppm of cadmium, and vomitus from patients contained 15.0 ppm of the metal. A case of poisoning occurred in one child who ate chocolate-covered ice cream on a stick. A washing powder, sodium metasilicate, may have spilled into the molds used in making the ice cream sticks, or it may have remained in the molds after cleaning. In another instance, 16 persons became ill shortly after eating breakfast on an excursion boat. The type and source of toxic agent could not be determined.

In four outbreaks reported, ingested foods produced toxic symptoms. In two instances, mushrooms were eaten. Castor beans caused illness in another. Consumption of smoked fish was reported as the probable cause of acute toxic symptoms in six persons.

LEGAL AND ECONOMIC ASPECTS OF FOOD ADDITIVES IN DAIRY PRODUCTS[1]

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In order to appraise properly the legal and economic aspects of chemical additives in dairy products, it is desirable to have a perspective of the origin and role of dairy products in the American diet. Relatively few staple foods are processed into as many useful forms as is milk. Milk is wholly useable as food. It may be converted into many forms such as cheese, butter, evaporated and condensed milk, skimmed milk, cream, ice cream and frozen desserts, dehydrated products, and so on. There are many forms of fractionated products. It has been reported over 500 varieties of cheese are made using only milk, rennin, microorganisms and salt. In these many forms, milk solids have been adopted for nutrition of all ages of man. The annual per capita consumption of food by man in the United States is about 1,700 pounds. The annual per capita consumption of fluid milk equivalent is about 700 pounds. Thus the form and character of dairy products is important in the American diet.

Not all milk produced is consumed in the form into which it is processed. Milk and milk products have great versatility as an ingredient in many food products: in bakery goods, cereals, soups, sauces, spreads, dressings, and so on. Many dairy product derivatives are processed especially for functional uses in food products. The synthesis properties of milk and its components with other ingredients is of great importance in the foods industry.

Although fluid milk is one of the most perishable of foods, it is processed into forms that have relatively long commercial stability. Unlike many other foods, milk and its products vary greatly from season to season. Nearly twice as much is produced in the spring as in the fall. Current production of milk in the United States is approximately 125 billion pounds annually, equivalent to 748 pounds per capita. The tremendous quantities of flush and surplus production is stored in processed form for use in periods of lesser production.

The storage qualities of dairy products are important in surplus commodity storage. Of the 125 billion pounds of milk produced in 1956 with a farm value of 4.5 billion dollars, 4.1 per cent or the equivalent of 5.1 billion pounds with a farm value of 1.84 billion dollars were represented in purchases by the government in price support programs. The purchases in 1956 included 165 million pounds of butter, 188 million pounds of American cheese, and 754 million pounds of nonfat dry milk solids. Much of this was involved in long periods of storage.

The processing of milk involves in nearly every case, adjustments in the ratio of its major components: in some cases the components are concentrated, in others fractionated or altered in proportions. These changes affect not only physical form, but also physico-chemical properties and behavior. Each of the applied processing modifications usually affects in some way the critical behavior of at least one of the components: fermentation, acidification, neutralization, salting, dilution, concentration, crystallization, homogenization, emulsification, dispersion, aeration, whipping, aggregation, separation, agglomeration, gelation, bleaching, coagulation, vaporization, and so on. Obviously, many of these treatments are affected by both incidental and intentional additives, and, in many instances, are achieved only by their use.

The legal aspects of chemical additives in dairy products should be appraised in the light of historical precedent. The waning decade of the last century in the United States was one of a gradual development of urban areas swelled by immigrants. The mortality of infants was high, in part because of insanitary conditions, lack of pediatric knowledge, and because of unwholesome milk. From this developed a legal concept of the necessity for local supervision of the quality and composition of milk. This concept is in use in virtually every community in the country today. Thus there prevails, by local fiat, regulations governing the sanitary and gross chemical composition of milk, and of its related products, in every community. The regulations in adjacent communities, and elsewhere, may vary in sufficient respect to prevent the ready interchange of milk and its related products among them. The barriers to interchange were long ago apparent. Beginning in 1923, the U. S. Public Health Service developed and made available a Recommended Milk Ordinance and Code to serve as a pattern for uniformity of regulations. Several major revision issues of the Recommended Ordinance and Code have been made in the interim. A major portion of the total bottled milk supply of this country is

[1]Presented at the 133rd National Meeting of the American Chemical Society, Symposium on Food Additives, San Francisco, April 14, 1958.

today produced, processed and marketed under the provisions of this ordinance, or of those in principle much like it. In a similar manner, the statuatory issues and regulations of many states developed under a concept of necessity of local supervision for milk and its products in many states have been frequently very different, and in many instances confounding. The Recommended Milk Ordinance and Code has been adopted *per se*, or in principle, by a number of states.

In 1951, the National Conference on Interstate Milk Shipments was established for the purpose of enabling certification of rating and acceptance of fresh milk for intershipment of milk between states. In a recent period some 20,800 shipments involving 488,000,000 pounds of milk were interchanged among states on the basis of the Conference agreements. The Conference, participated in by regulatory officials of 34 states and the District, has adopted the Recommended Milk Ordinance and Code, or its principle, as the basis for certification rating of milk supplies. In like manner, a Conference on Intrastate Milk Shipments was established in 1956 in Wisconsin to enable ready interchange of milk and processed milk products between cities within the state.

Prior to 1940, the qualification of the sanitary sufficiency of design of milk processing equipment was subject to approval of local health departments. The concept of adequacy of sanitary design of equipment was almost as varied as the number of departments. For a period of years, virtually all equipment used in processing milk and similar products was, in effect, custom-made. Such equipment could not be moved intercompany, intercommunity, or interstate without custom inspection of farm or factory. The cost of custom manufacture, and multiple inspections obviously were prohibitive. In many instances processing plants have been subject to as many as 15 - 25 separate inspections annually by regulatory officials representing various communities and states. Frequently procedures or equipment mandatory by one were prohibited by another. Subsequent to 1940 there had been developed what is now known as the 3A Sanitary Standards for Dairy Equipment. These have been developed through joint effort of the Dairy Industry Committee representing product and equipment manufacturers associations, the U.S. Public Health Service, and the International Association of Milk and Food Sanitarians. Standards have been established for some 30 categories of processing equipment. This concept of sanitary design standards is being patterned in other foods industries.

In the light of the historical sequence in the development of regulatory standards for milk at the local level, it should be apparent there has been a serious and zealous intent to protect the inherently good qualities and characteristics of milk. Born of an era of dilution of milk by water, doctoring by simple preservatives, in a period of a great strife to eradicate a rampant cattle tuberculosis, within a period of development of mechanical refrigeration, pasteurization, and of the transition from farm to factory dairy production, it is not surprising that regulatory concepts traditionally have been cool to necessity of functional additives in dairy products. It may appear that regulations covering the sanitary qualities of milk and its products are beyond the realm of subject of chemical additives, but they definitely are not. Virtually all city and state ordinances or regulations for sanitary standards of fluid milk and its related products contain definitions of each of the specific dairy products. Thus there exists a set of standards of identity which are inviolable, and preclude modification by additives.

The 1906 act covering foods required a long period of some 30 years before its final formulation as the Heyburn bill and adoption by Congress. Among reasons for delay in the passage of such a bill was the strong political movement for protection of states rights, and the implication that the philosophy of *caveat emptor* should prevail. Among the problems of that period were the need for (a) a uniform law in supervision of foods, (b) need for specific control of various forms of adulteration, and (c) the relatively limited supervision over foods in a number of states. It was within the period of this act that many states established varying standards not only in quality but also in composition of manufactured dairy products. Once established, any exceptions have been only painfully undertaken. The 1938 Federal Act undertook not only the establishment of the integrity of foods, but several distinctive objectives which affect dairy products, including: (a) it prohibits traffic in foods which may be injurious to health in contrast to the previous provision which prohibited injurious food only when a poisonous substance was added; (b) it specifically prohibits the addition of poisons to foods with defined exemptions; (c) it specifically requires label declaration of the presence of artificial coloring, artificial flavoring, and chemicals present in the foods, but specifically exempts butter, cheese and ice cream from the requirement on artificial coloring; (d) it provides for promulgation of standards of identity and of fill of containers of foods, although, butter was specifically exempted in this provision but was included by statutory reference; (e) it requires that labels for foods for which no definition or standards of identity have been promulgated bear the common or usual name of the food, and if of two or more ingredients, the common or usual name of these, excepting spices, flavorings, and colors which need not be specifically

so named; (f) it requires that labels of foods for specific dietary uses inform the purchaser fully of its vitamin, mineral and other dietary properties; (g) it avoids the "distinctive name" proviso; and (h) it specifically prohibits the presence of filthy, putrid or decomposed material, and prohibits unsanitary conditions whereby the food may or many not be subject to contamination.

These provisions all have implications for dairy products. While many states have locally developed standards for dairy products, many others gradually have adopted in form or principle those of the 1938 Federal Act.

The procedure of the Standard of Identity had several objectives; the enabling of fair trade of common foods and the establishment of integrity and of consumer understanding of foods. It contemplates not only a specification of the ingredients that may be used, but also where practicable, their quantitative limits. These objectives undoubtedly have been attained where such standards have been developed. The establishment of such standards has in many instances been painful and costly for both government and industry, requiring sometimes a period of years. Having been established, thus painfully, there has been generally great reluctance to propose changes in the light of new process developments or ingredients. It is generally believed the scope and intensity of research and development of new features for standardized food products is scanty in comparison with that of non-standardized food products. Consideration of a change may involve a large development expense, it may involve industry opposition, it may involve considerable legal expense in its prosecution. Experimental marketing to test consumer approval of a new product is possible via temporary permit which is an authority of the Food and Drug Administration. A successful product development and test must be followed by exposure in hearings or prospectus of the technical experience thus acquired at considerable cost. Thus, in effect, the objectives of the standards of identity have been beneficial on the one hand, but limiting on the other.

One of the earliest standards of identity developed within the 1938 act was for evaporated milk. Although a number of experimental modifications of this product have been conceived, none has been proposed. An evaporated product in which vegetable fats have been substituted for butterfat was developed many years ago. It has been excluded from interstate trade by a prior Filled Milk Act. It is, however, produced extensively statewise and the protective effect of the federal act greatly diminished. Recent developments of sterile concentrated milks have many potentials of form and application.

The standards for butter were originally provided by statute in 1923 and thus included by reference in the 1938 act. Although modification of butter to produce a wholesome, nutritional and less costly new product is technically feasible, apparently no change, or proposal for change of the standard has been made in the interim. Congressional action may be necessary to enable modification of the standards of butter. An "imitation butter", marketed apparently under the aegis of the decision on "imitation jam" is now being test marketed.

At least two court decisions bearing on the scope and application of standards of identity for foods have had implication for dairy products. The farina case involved the propriety of adding vitamin D to *regular* farina, the standard of identity of which did not provide for it. Another standard for an *enriched* farina, containing added nutritional factors, was available. The decision held that the common name farina would be clouded if permission were granted to modify it at will, evenly addition of a beneficial factor. This decision probably influenced possible modification, or consideration of modification of standard foods for many years. In the jam case, historically more recent, a manufacturer made and offered for sale properly identified as "imitation jam", a product made of the same ingredients as provided in the standards for jam, but of different proportion or composition. The court held that since the product was properly labeled "imitation jam", it did not purport to be a true jam, and was in fact, a different product, and properly labeled. This decision has implications for many dairy products, since many are subject to convenient modification simply by varying the amounts of the components cited in the standards of identity.

The identity of skim milk powder was established by statute in 1941 in the definition of nonfat dry milk solids. There are a number of possible modifications of this product through use of fat, emulsifiers or vitamin components. Modification of the act, however, probably could be achieved only by Congressional action. Following lengthy hearings in 1947, standards of identity were issued for some 36 varieties, 8 classes and 16 categories of cheese. The development of these standards has aided in defining composition limits of the respective varieties and forms of cheese, as well as what is essential in the art and technology of their manufacture. Just recently proposed standards of identity were issued for ice cream, frozen custard, ice milk, fruit sherbets and water ices. The hearings for these standards lasted about two years beginning some five years ago. Standards have been issued for ice cream and plain and sweetened condensed milks.

Shortly after the enactment of the 1938 act prosecution was made of a creamery company in allegation of

both presence of filth in butter, and, because it was packed under conditions where it *may* have become contaminated with filth. The decision supporting this allegation of adulteration is an outstanding example of shift in philosophy for responsibility of hazard in a food; from *caveat emptor* to the concept that the consumer has every right to assume that not even the chance of hazard is involved. The act further provides that a food product is adulterated if it bears or contains any poisonous or deleterious substances which *may* render it injurious to health; the interpretation of this part of the act is commonly referred to as the "*per se*" doctrine which prohibits, with certain exceptions, chemicals which of themselves are harmful. These two provisions within the 1938 act on adulteration have had their implications in the dairy industry.

INCIDENTAL RESIDUES

Chemical additives may be incidental or intentional. The control of presence of the incidental residues, those which become present, not by intent, is sometimes difficult under the system of producing and handling milk and its products, and requires constant vigil. An example of a problem of incidental residues is antibiotics used for control of biological infections of animals. Most currently used antibiotics are stable to the processes normally used for milk and dairy products. The antibiotics are extensively marketed as over the counter items, and used in remedial and professional treatments of animal infections. Unless the milk is withheld for periods of at least 72 hours after application, the presence of residual antibiotic is possible. Currently no known universal rapid critique has been developed for identification of the presence of the several antibiotics presently used. The most recent approach to the problem of control has been in limit of concentration of antibiotic in the medicant. Another example of form of incidental residue is that which devolves to milk via residues on forage or feed fed the cow. The use of synthetic chemical insecticides in crop insect control has increased tremendously since their introduction ten years ago; under conditions of ill-advised application, residues of certain insecticides on forage are transmissable through the animal in minute though measureable quantity into the milk. It is conceivable certain insecticides may be transmitted through forage to milk through carry over in soils from applications made to previous crops in previous seasons. In a similar manner certain insecticidal sprays are transmissable via absorption, into milk, when applied to the animal. The presence of incidental residues in milk may occur through improper use, or selection of insect sprays, detergents or sanitizers which remain as residues of films on contact surfaces.

Although direct steam injection has long been used in heat processing certain dairy products the use of this system in flash vacuum aeration treatments of fresh milk has resulted in critical analysis and criticism because of the possible presence of undesirable hazardous contaminants in the steam.

Because dairy products are processed in many forms and are subject to a tremendous range of processing treatments, virtually every conceivable form of package material has been applied; wood, cloth, waxes, paper, plastics, films, foils and rigid and flexible laminants. The selection of such package materials necessarily must be based within the limits of technical judgement and according to the criteria of safety recommended by the Food and Drug Administration.

INCIDENTAL ADDITIVES

Modern dairy products frequently are blends of ingredients; a tremendous range of functional and nutritive components may be used. Indirectly, however, incidental or intentional residues in the components may become residues in the final food product. Examples of such incidental residues derived from ingredients are emulsifiers or solvents in flavors, colors, or vitamin preparations, antioxidants or stabilizers in nut meats, or in fruits or flavors, diluents in functional preparations, and so on. Considerable need exists for more complete understanding of the precise chemical nature of the additives which normally are used in routine formulary work in processing dairy products. A bromacopoeia has been proposed and would be a highly useful tool for qualifying many necessary ingredients used in dairy products, as well as in other foods.

INTENTIONAL ADDITIVES

Standards of identity have been established, and are in proposal for virtually all the major categories of dairy products. Out of a total of 677 million pounds of milk equivalent represented in domestic milk products, essentially 95 per cent is covered by standards of identity or statute law, where it is involved in interstate trade. Virtually all major manufactured dairy products are destined for interstate trade. Within the past 15 years there has been a great consolidation of facilities for processing fluid milk and cream and related products, and now much of the output of these are involved in interstate trade. In effect then, the standards of identity are both helpful in protecting integrity of dairy products and at the same time limiting in the modifications or improvements which might be used or adopted. There have been listed 12 categories of intentional chemical additives in the report "The Use of Chemical Additives in Food Processing" (Bulletin 398 of the National Research

Council). Virtually every category of additive is represented by one or more chemical substances in the various standards for dairy products that have been established or currently proposed. In the light of the great number of chemical substances that are being developed, it is important to the dairy industry that the potentiality of these be fully known to enable convenient and economical dairy products in the diet, and because of the great competitive position of other foods not defined by similar specification standards.

There are many areas in which improvement of nutritional, economic or quality value of dairy products may be achieved by use of selected functional additives such as stabilizers, antioxidants, antimycotics, and emulsifiers, but which are not used because of lack of legal provision for them in federal or state standards. The Food and Drug Administration is empowered to grant temporary permit for test incorporation of a new ingredient in standardized foods. The temporary permit, which forestays the application of a "purports to be" rule, is a useful tool, and should be used more extensively collectively by the industry in achieving desired modifications in the existing standards. There is a great need for a similar procedure within state regulations. The Hale Amendment to the Food and Drug Act should enable ready consideration of proposed changes in the standards.

A major problem within the dairy industry is the rather great variation in the state standards and regulations which define various products, and which provide for labeling terminology. Although the various state standards tend to encompass the federal standards when such products are not locally produced, this is certainly not the case for many products which are, or may be produced or processed locally under a community, or state, jurisdiction.

As specific examples, there occur variations within cities, and between states on regulations permitting uses of products such as the following: preservatives, colors, flavors in fruit in ice cream, the use of single and multiple vitamin additives in milk, the form of carrier or solvent for vitamin additives for milk, the use, or form of stabilizer for ice cream, chocolate milk, or buttermilk, the use of acidifiers, or stabilizers, in cream for cottage cheese, the use of enzyme as antioxidant curd modifier of milk, the use of mold inhibitors in product or package as for cheese, and so on. Although cream is covered in a standard of identity, frozen cream which is extensively used in product manufacture is not; hence modifications of cream, as by use of antioxidant to enhance its storage quality while frozen, is not. The possible modification of frozen cream by modifying agents which have not been adjudged harmful, is a subject entirely of local interpretation. Another example of a problem of interpretation is that of identity and classification of processed modified dairy products as ingredients in dairy products; thus ion exchange treated milk solids is especially useful in condensed ice cream paste and sol modified casein is effective as a stabilizer in ice cream mixes. When a process or product is not already defined by a local state regulatory category of exceptions, then reference is made to federal standards for precedent, or a local concept is imposed. This variation in regulations is, of course, difficult for manufacturers of dairy products and of various functional agents which may be destined as intentional additives, or which may be considered in their light as incidental residues. This variation in regulations is difficult also for processors of products whose operations cross state lines; many processors of perishable fresh milk and related products now are engaged in interstate and intrastate commerce, either in procurement of their milk supplies, or in their marketing.

Although variation in specification in components is in itself a major problem for interstate purveyors, variation in requirements for labeling are similarly involved; even at the simplest level confusion can exist as shown by sample selected names for ordinary milk. Dairy products are quite amenable to modification and new products can be conceived for which special category classification, regulation and terminology may be involved; thus nonfat dry milk solids can be added to improve certain characteristics of chocolate milk, buttermilk, or skimmilk for cottage cheese, or in modification of skim or whole milk. On the other hand, although the term nonfat dry milk solids has been established by federal statute, it is not acceptable nor permissable to use it in certain state areas. The specification in terminology as developed in standards of identity is sometimes limiting in the use of dairy products as an ingredient in foods; thus a blend of two types of cheese has been made for special use in a bakery product, but for purposes of label declaration, no name exists for the blend.

In summary, the production and marketing of dairy products is quite subject to many legal specifications which proscribe and prescribe use of possible chemical additives.

THE EFFECT OF DIPPING COWS' TEATS IN A GERMICIDE AFTER MILKING ON THE NUMBER OF MICROCOCCI ON THE TEAT-CUP LINERS

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(Received for publication June 6, 1958)

It is often recommended that the teats of milking cows be dipped in a germicidal solution immediately after milking (*1, 3, 4, 7*).

Moak (*4*) reported that the complete elimination of *Streptococcus agalactiae* infection from some herds resulted from dipping the cows' teats in a weak solution of a pine oil disinfectant. Gould (*1*) thought that cleansing the teats after milking was a far more important factor from the point of view of mastitis control than cleansing the teats prior to milking. Hodges and Tucker (*2*), as a result of observations in the New York State Mastitis Control program, placed dipping of teats as the third most important among a group of management and environmental factors studied. Hodges believed that by washing away the milk from the end of the teat, food for the bacteria is removed and at the same time a mild disinfectant may destroy some of the bacteria present. Oliver, Dodd and Neave (*6*) reported a highly significant reduction in the incidence of mastitis infection by *Staphylococcus aureus,* in the early dry period, by washing the teats and then dipping them in 5% tincture of iodine after the last milking and again 24 hours later.

There seems to be no published information regarding the direct effect of the practice on the micrococci attaching to the teat-cup liners.

EXPERIMENTAL

The cows used in these experiments were in a small barn on the College Research Farm. They were milked with a short tube milker, and the teat-cup liners were stored between milkings in a plastic pail with a perforated bottom immersed in 5% lye solution in a 5-gallon can. Two sets of liners were used in alternate weeks, the set removed at the end of each week was boiled in 3% lye, washed and stored dry until put into use again at the end of the next week. Between cows teat cups were treated as described previously (*5*). Udders were washed with warm water and individual paper towels.

Two teats of each cow were dipped to the base in a jar of germicide immediately after each milking, while two were left undipped. Each concentration of germicide was used on three cows for a period of four weeks.

On Monday, Tuesday and Wednesday of each week, at the evening milking, the teat-cup liners were swabbed and the micrococci enumerated by the methods previously described (*5*).

MATERIALS

To determine the effect of rinsing the teat only, in the first experiment the teats were dipped in warm water with no germicide added.

Subsequently Hibitane, Iosan, Sodium hypochlorite, 70% Ethyl Alcohol and Tincture of Iodine were used.

RESULTS

The mean counts obtained from 2 teat-cup liners from each of 3 cows, swabbed 3 times weekly for 4 weeks are shown in Table 1.

TABLE 1—EFFECT OF DIPPING TWO TEATS OF EACH COW IMMEDIATELY AFTER MILKING ON THE NUMBER OF MICROCOCCI ON TEAT LINERS

Germicidal solution	Conc. active ingredient	Mean liner counts[a]		
		Teats Dipped	Teats not-dipped	P
Water only		20,000	14,400	< .02
Iosan	50 p.p.m.	40,800	44,800	
	100 p.p.m.	23,800	32,000	<0.01
Hibitane	100 p.p.m.	13,100	13,900	
	200 p.p.m.	9,100	13,200	
	400 p.p.m.	17,100	15,100	
	800 p.p.m.	23,100	21,100	
Sodium hypochlorite	1000 p.p.m.	18,000	24,800	> .02
Tincture of Iodine	1%	7,800	16,200	< .01
	2.5%	6,400	17,800	< .01
Ethyl alcohol	70%	22,800	34,800	< .01

[a]Mean number of micrococci per teat-cup liner from 2 teats of 3 cows, 3 times weekly for 4 weeks.

When the teats were dipped in warm water only there was a significant (P=>.02) increase in the number of micrococci on the liners as compared to those from teats not dipped. The liners from teats dipped in Iosan solution containing 100 p.p.m. available Iodine gave significantly (P=<.01) smaller counts than those from teats not dipped. Hibitane produced variable, ineffective results. The use of a solution of sodium hypochlorite containing 1000 p.p.m. available chlorine resulted in significantly (P=>.02) lower counts on the liners. Dipping teats in tincture

of iodine gave the most promising results. Both 1% and 2.5% tinctures resulted in highly significant (P=<.01) reductions in the liner counts. 70% alcohol was also effective.

DISCUSSION

The practice of dipping cows' teats immediately after milking is predicated on the assumption that this washes the milk film off the teats and probably reduces the number of organisms present there. Experiments reported here show that teat-cup liners from teats which were dipped in warm water only have a higher number of micrococci on them than those from undipped teats. This indicates that any advantage gained by washing away the milk film is more than offset by the increased multiplication resulting, presumably, from the added moisture. To be useful, then a solution for teat-dipping must be able to prevent this multiplication in addition to washing off the milk film.

The most promising germicide was tincture of iodine, either 1% or 2.5%, since its routine use resulted in the largest decreases. However these tinctures were the only materials used having an undesirable effect on the cows' teats which became cracked and scaly, although they were not sore and presented no real problem.

The failure of Hibitane, even at a concentration of 800 p.p.m., to effect the liner counts is surprising in view of the results obtained with this material as an udder wash (5). It would appear that the combined actions of the surface active agent, used to maintain the active salt in solution, and the scrubbing by the paper towel resulted in the germicide reaching the sub-surface skin layers, which did not happen when the teats were dipped only.

SUMMARY

Warm water, Hibitane, Iosan, Sodium hypochlorite, 70% Ethyl Alcohol and Tincture of iodine, used for dipping teats immediately after milking, were tested to determine their effect on the number of micrococci on teat-cup liners. Teat-cup liners from teats dipped in Iosan (100 p.p.m. available iodine), sodium hypochlorite (1000 p.p.m. available chlorine) 70% ethyl alcohol, and tincture of iodine (1 per cent and 2.5 per cent) showed significantly lower counts than those from teats which were not dipped. The use of warm water for dipping teats resulted in a significant increase in the numbers of micrococci on the teat-cup liners.

REFERENCES

1. Gould, O. N. The Control of Mastitis. Vet. Record, 55:491, 1945.

2. Hodges, H. G. and Tucker, E. W. Personal communication.

3. Murnane, D. Studies on Bovine Mastitis: The Influence of Milking-Shed Hygiene on the Spread of Infection of *Streptococcus agalactiae*. Australian Vet. Jour., 29: 70-72, 1953.

4. Moak, H. Control and Eradication of Infectious Mastitis in Dairy Herds Cornell Vet. 6, 36-40, 1916.

5. Newbould, F. H. S. and Barnum, D. A. The Effect of Germicide used for Udder Washing on the Number of Micrococci on Teat-Cup Liners. J. Milk & Food Technol, 21: 306-308, 1958.

6. Oliver, J., Dodd, F. H. and Neave, F. K. Udder Infections in the 'Dry Period'. V. The Effect of Teat Disinfection at the Drying off on the Incidence of Infections in the Early Dry Period. Jour. Dairy Res. 23: 212-216, 1956.

7. Wilson, C. D. Hibitane: A New Disinfectant for the Control of Mastitis. Vet. Record, 67: 645-650. 1955.

Special Service Article

SOME PUBLIC HEALTH ASPECTS OF FOOD AND BEVERAGE VENDING

Editor's Note: This is the second in a series of three articles on food and beverage vending. The first appeared in the November issue of the Journal. This article, and the one to follow, will present current and factual information on this relatively new form of food and beverage merchandising.

Degree of Food Perishability Recognized in Regulations

The first article of this series, pointed out that both the vending industry and public health authorities recognized public health implications in the automatic vending of foods and beverages. This led to a closer look at vending from the standpoint of the kinds of products vended. A rather substantial number presented no particular difficulty. Such items as crackers, cookies, gum and light confections fell into this general category. Carbonated beverages, bottled in an approved plant and dispensed in the original sealed bottle, likewise raised no unusual problem. The dispensing of these products is analogous to their sale from confectioner's and grocer's shelves, the only difference being the merchandising method used.

Food and beverage vending, as we now know it, involves the sale of more than the products mentioned above. Within the past several years, the variety of foods and beverages vended has both changed and expanded. Today the customer can select from a wide variety of products. He can buy a hot or cold sandwich, hot beverage to which he may add fresh cream; milk, salads, hot canned foods, hot stews and soups and even pre-packaged frozen meals which go through a heating cycle in the machine and are delivered oven hot to him.

This recognition of the types of products vended and the difference in degree of perishability lead to a definition of what is meant by a readily perishable food. The following definition which appears in the Ordinance and Code covering the Vending of Foods and Beverages Recommended by the Public Health Service, is therefore, both pertinent and specific.

> *The term "readily perishable foods" shall mean any food or beverage or ingredients consisting in whole or in part of milk, milk products, eggs, meat, fish, poultry, or other food capable of supporting rapid and progressive growth of microorganisms which can cause food infections or food intoxications. However, products in hermetically sealed containers processed by heat to prevent spoilage and dehydrated, dry or powdered products so low in moisture content as to preclude development of microorganisms are excluded from the terms of this definition.* (1)

In the light of this definition it is quite apparent that machines which dispense *readily perishable foods* constitute that group requiring most careful attention. Responsibility in this case is shared by three interested groups. The manufacturer, initially, has a clear cut obligation to design and build machines which incorporate mechanisms to protect perishable products. Then the operator has a responsibility to see that his total servicing and maintenance operations are hygienically managed. Lastly, pubic health agencies must evaluate and supervise the whole situation from the viewpoint of acceptable sanitary food handling practices.

Safeguards for Product Protection

Vending machines currently coming off manufacturer's production lines have a number of features incorporated which give ample protection to readily perishable foods and beverages. In machines which vend such items as sandwiches, salads, fluid milk and cream and comparable perishable products, refrigeration equipment and controls are built in which insure a storage temperature of 50°F. or below. In models currently in use temperature ranges in compartments for perishable storage are more commonly in the range of 38-40°F. Should refrigeration fail and the storage compartment rise above 50°F, an automatic control locks the machine out of service, coins are rejected and customer service ceases.

In the case of machines storing and dispensing readily perishable hot foods, unless in heat processed hermetically sealed containers, a temperature requirement of not less than 150°F is specified. Controls and cut-out devices must be provided for these machines in case storage temperature falls below 150°F.

The specific requirement for protection of readily perishable hot and cold foods is stated in the Ordinance and Code and reads as follows:

> *Readily perishable foods or ingredients within*

the vending machine shall be maintained at a temperature not higher than 50°F., or a temperature not lower than 150°F. Vending machines dispensing readily perishable foods foods shall be provided with controls which insure the maintenance of these temperatures at all times; Provided, that an exception may be made for the actual time required to fill or otherwise service the machine and for a maximum recovery period of 30 minutes following completion of filling or servicing operations. Such controls shall also place the machine in an inoperative condition until serviced by the operator, in the event of power failure or other condition, which permits the food storage compartment to attain a temperature above 50°F., or below 150°F., whichever is applicable. Vending machines dispensing readily perishable food shall be provided with a thermometer which, to an accuracy of ± 2°F, indicates the air temperature of the food storage compartment. (1)

In addition to temperature control safeguards there are others designed to give product protection. Containers and other product and ingredient content surfaces must be constructed of non-toxic, corrosion resistant and relatively non-absorbent materials. All such surfaces must be smooth, in good repair, free of breaks, corroded places and other such imperfections. In general use are such materials as stainless steel, spun aluminum used for dry ingredients, plastic and such materials as polyethylene, latex tubing, tin plated enamel ware and ceramics.

The section of the Ordinance and Code covering this particular subject is set forth as follows:

All product contact surfaces of vending machines shall be smooth, in good repair, and free of breaks, corrosion, open seams, cracks and chipped places. The design of such surfaces shall be such as to preclude routine contact between food and V-type threaded surfaces. All joints and welds in product contact surfaces shall be smooth; and all internal angles and corners of such surfaces shall be rounded to facilitate cleaning. (1)

PRODUCT CONTAINER DESIGN SPECIFIED

Containers for products and ingredients must comply with certain specifications. If the product container is of the non-pressurized type, covers must have an overlapping flange and be sloped to prevent condensation, drippage or other overhead contamination from reaching the product. If there are port openings in covers these are required to be flanged upward at least 3/8 inch as another precaution to prevent product contamination. If rotary shafts, vertical pipes, thermometers or other functional parts extend into the container, drip deflecting aprons are required unless a water tight seal is provided. As mentioned above, covers for pressurized containers do not have to meet these exacting specifications since internal pressure necessitates a sealed, air and water tight cover. The pressurized container is used most commonly in machines of the pre-mix type which dispenses carbonated beverages. Delivery of the beverage is from a pressurized tank which has been cleaned, sanitized and filled at a beverage bottling plant, and is ready for immediate service as soon as it is connected to delivery tubes in a machine.

SPECIAL PROTECTED AGAINST CO_2 BACK-UP

In contrast to the pre-mix machine the post-mix machine carbonates water directly in the machine prior to delivery to the cup. This means a cylinder of gas and a carbonator is used where water and carbon dioxide are mixed and cooled. This calls for a direct water connection to the carbonator. Under ordinary operating conditions the connection is made directly to the machine through copper tubing to the building water supply. Some few instances are on record indicating that a leaky check valve has permitted carbon dioxide gas to seep back into copper tubing. Under proper conditions of pH, accompanied by the slow bubbling of the gas into copper tubing, persons getting the first drink from a machine, idle for several hours, have shown clinical symptoms of copper poisoning. Copper is an emetic causing nausea and vomiting. Valves are now available and installed on current model post-mix beverage machines which reduce such occurrence to a bare minimum. However, health agencies should especially examine older model post-mix machines operated within their jurisdiction to insure that a protective device to prevent carbon dioxide back-up is installed.

The provisions of the Ordinance and Code are specific in this regard and require that protective valves or devices be installed downstream from all copper tubing. The applicable provisions are as follows:

All vending machines which dispense carbonated beverages and which are connected to a water supply system, shall be equipped with two (or a double) check valve; or an air gap; or a device approved by the health authority, which will provide positive protection against the entrance of carbon dioxide or carbonated water into the water system.

Where check valves are used for the protection of the water supply system, a screen of not less than 100 mesh to the inch shall be installed in the water supply line immediately upstream

from the check valves.

In all vending machines which dispense carbonated beverages and which are connected to a water supply system, the ingredient water contact surfaces from the check valves or other protective device downstream, including the device itself, shall be of such material as to preclude the production of toxic substances which might result from interaction with carbon dioxide or carbonated water. (*1*)

While this article has attempted to describe some of the important features of machine construction for product protection in machines dispensing readily perishable foods and beverages, the reader is especially encouraged to consult Public Health Service Publication 546, which is the Sanitation Ordinance and Code dealing with food and beverage vending.

In the next and concluding article of this series, discussion will be devoted to commissary and machine inspection and the administrative phases of supervision involved in this aspect of the food industry.

REFERENCES

1. U.S. Department of Health, Education and Welfare, Public Health Service, "The Vending of Foods and Beverages, A Sanitation Ordinance and Code 1957 Recommendations of the Public Health Service". Publication 546.

NEWS AND EVENTS

NOMINATIONS FOR SANITARIANS AWARD FOR 1959 DUE MAY 1

Announcement is made that nominations will be accepted for the Annual Sanitarians Award until May 1, 1959 and members of the International Association of Milk and Food Sanitarians, Inc. are requested to consider the nomination of individuals whose professional work in the field of milk and food sanitation has been outstanding in their communities.

The somewhat earlier date for the close of nominations is brought about by the fact that our convention is being held somewhat earlier than usual.

The Award consists of a Certificate of Citation and $1,000 in cash, it is sponsored by the Diversey Corporation, Klenzade Products, Inc., Oakite Products Inc., Pennsylvania Salt Manufacturing Co. and the Olin-Mathieson Chemical Corp. It is administered by the International Association of Milk and Food Sanitarians, Inc. and is presented annually. The next presentation will be made at the 46th Annual Meeting of the Association which is to be held at Glenwood Springs, Colorado in August, 1958. The Sanitarians Award was initiated in 1952, and was presented in 1958 to Mr. Carl A. Mohr, Sanitarian and Deputy Health Officer of the City of Green Bay, Wis.

The Executive Board of the Association has established the following rules and procedures governing the Sanitarians Award:

Eligibility

The rules concerning eligibility of candidates are:

1. Any living citizen of the United States or Canada who, at the time of nomination is employed as a professional milk and food Sanitarian or both, by a county or municipality, is eligible for the Award except members of the Executive Board and members of the Committee on Recognition and Awards of the International Association of Milk and Food Sanitarians, Inc. Employees of State or Federal Agencies and of industry are not eligible for the award. Membership to the International Association of Milk and Food Sanitarians, Inc. is not a prerequisite of eligibility and there are no restrictions as to race, sex or age.

2. A candidate shall have made a meritorious contribution in the field of milk and food sanitation to the public health and welfare of a county or municipality within the United States or Canada.

3. The achievements and contributions on which the Award is to be based, must have been completed during the five year period immediately preceding January 1st of the year during which the Award is to be made. Under special circumstances, consideration will be given to related work accomplished by the candidate during the seven-year period preceding January 1st of the year during which the Award is to be made. Under this rule, the principal work to be considered for the 1959 Award must have been performed during the period January 1, 1954 to January 1, 1959 and the related work during the period January 1, 1952 to January 1, 1959.

4. Co-workers are eligible for nomination if both have contributed equally to the work upon which the nomination is based.

5. No person who has once received the Award shall be eligible for nomination.

Nominations

Nominations of candidates for the Sanitarians Award may be submitted by Affiliate Associations of the IAMFS, or by members of the Association in good standing except members of the Executive Board, Members of the Committee on Recognition and Awards, and employees of the sponsoring companies. Nominations from persons who are not members of the Association cannot be accepted. No member or Affiliate may nominate more than one candidate in any given year.

Each nomination must be accompanied by factual information concerning the candidate, a resume of his work and achievements, evidence supporting his achievements and, if available, reprints of publications. A form for the submission of nominations may be obtained upon request from Paul Corash, Chief, Division of Milk Inspection, Department of Health, 125 Worth Street, New York 13, N.Y., or from Mr. H. L. Thomasson, Executive Secretary, International Association of Milk and Food Sanitarians, Inc., P. O. Box 437, Shelbyville, Indiana.

Deadline for Submission of Nominations

The deadline for submission of nominations is May 1, 1959 and all nominations and supporting evidence must be postmarked prior to midnight of that date.

Selection of the Recipient

The Committee on Recognition and Awards of the International Association of Milk and Food Sanitarians, Inc. has full responsibility for selecting from among the candidates nominated the recipient of the Sanitarians Award. In judging the contributions of each candidate, the Committee on Recognition and Awards of the International Association of Milk and Food Sanitarians, Inc., has full responsibility for

selecting from among the candidates nominated the recipient of the Sanitarians Award. In judging the contributions of each candidate, special consideration will be given to (a) originality of thought, mode of planning and techniques employed, (b) the comprehensive nature of the candidate's achievements, and (c) their relative value as they affect the health and welfare of the candidate's community. The Committee will give consideration also to the efforts of the candidate to establish professional recognition in the community in which he serves, as well as to his research, administrative development, program operation and educational achievements. Additional information or verification of submitted information will be requested when considered necessary by the Committee. *Testimonial Letters in behalf of the candidate are not desired.*

If, after reviewing the nominations and supporting evidence, the Committee should decide that the work and achievements of none of the candidates had been significantly outstanding, the Award shall not be made. In this connection, it is fundamental that if meritorious professional achievement cannot be discerned, the Award shall be omitted for a year rather than to lower the standards for selection of a recipient.

The 1959 Committee on Recognition and Awards consists of Paul Corash, *Chairman,* New York City, N.Y., James M. Doughty, Jr. Austin, Texas, Richard Mansfield, Clinton, Tennessee, Harold B. Robinson, Washington, D.C., Dr. Robert F. Holland, Ithaca, N.Y. and Mr. Cameron Adams, Olympia, Washington.

NOMINATIONS FOR CITATION AWARD DUE MAY 1

The Committee on Recognition and Awards wishes to announce at this time that the submission of nominations to the Citation Award is now in order.

The *Citation Award* was created for the purpose of bestowing recognition upon members of the International Association of Milk and Food Sanitarians, who, through long and distinguished service, have contributed greatly to the professional advancement, growth and reputation of the Association. This Award, first given in 1951, is presented each year at the Annual Meeting to the nominee or nominees whose past services and contributions have been judged to be the most outstanding.

Any member or Affiliate Association may nominate an individual for the Citation Award. Nomination must be accompanied by a supporting statement listing the individual's past contributions and services. Selection of the recipient is the responsibility of the Committee on Recognition and Awards.

Final nomination for the Citation Award must be submitted by May 1, 1959, to the Chairman of the Committee on Recognition and Awards, Mr. Paul Corash, Chief, Milk Division, Department of Health, 125 Worth Street, New York, N.Y.

HELPFUL INFORMATION

Editorial Note: Listed below are some sources of information on a variety of subjects. Requests for any of the material should be sent by letter or postcard to the source indicated.

Descriptive Bulletin of a Curd Tension Meter. Bulletin No. 1P5132-M, Cherry Burrell Co., Dept. JMFT, 427 W. Randolph St., Chicago, Ill.

A Safe Water Supply. Free Extension circular available from Bulletin Room, College of Agriculture, University of Wisconsin, Madison, Wisc.

ASTM Standards on Paper and Paper Products and Shipping Containers. Book. 406 pages. Published by American Society for Testing Materials, Philadelphia, Pa. Price $3.75.

Fluoridation of Public Drinking Water. A report. Cat. No. 82/2:H. Report, 2500. Available from Supt. of Documents, Washington, D. C. Price 5 cents.

Radiation Sterilization of Foods. Bulletin. Cat. No. Y4, 7/21 F73. Available from Supt. of Documents, Washington, D. C. Price 20 cents.

Grower Handling of Red Cherries. Agric. Res. Circular 291. Available from Supt. of Documents, Washington, D. C. Price 15 cents.

Principles of Bacteriology and Immunity. Book (two volumes) by G. S. Wilson and A. A. Miles. 4th ed., 2331 pages, $24.50. Williams and Wilkins, Baltimore, Md.

Methods in Enzymology. Book by S. P. Colowick and N. O. Kaplan. Vol. 2, Preparation and Assay of Enzymes. 987 pages. 1955. Price $23.80. Academic Press, 125 E. 23rd St., New York, N. Y.

Some Improved Methods of Handling Frozen Food in Wholesale Plants. 44 pg. bulletin. No. MRR 107. Available from Supt. of Documents, Washington, D. C. Price 25 cents.

Barn Mow Hay-Drying for Better Quality Hay. Free circular No. 154. Available from California Agri. Expt. Sta., Berkeley 4, Calif.

Higher Profits Through Better Milking. Free bulletin by G. H. Hopson. Available from The DeLaval Separator Co., Poughkeepsie, N. Y.

Bulk Handling of Wisconsin Milk-Farm to Plant. Free Res. Bul. 192. 72 pp. Available from Bulletin Room, College of Agriculture, Madison, Wisc.

An Introduction to Statistics in the Medical Sciences. Book by H. C. Batson. 1956, 81 pages. Burgess Publishing Co., Minneapolis 15, Minn. Price $3.00.

Requirements for the Sanitary Production of Sweet Cream and Milk for Manufacturing. A comprehensive and practical program designed for milk producers and processers in the production of high quality sweet cream and milk for manufacturing. No. 1 General Statement. No. 2 Operating Manual. Available from Dairy Products Improvement Institute, Inc., Dept. JMFT, 302 East State St., Ithaca, N.Y.

Handbook of Poisons. Book by R. H. Dreisbach. 1955. 426 pages. Price $3.00. Lange Medical Publications, Los Altos, Calif.

The Use of Chemical Additives in Food Processing. A report by the Food and Nutrition Board. Publication No. 398. 91

pages. Price $2.00. Available from The National Research Council, 2101 Constitution Ave., Washington, D. C.

Efficient Machine Dishwashing. Sound slide film available from Fred King, Specialized Cleaning Products, Dept. JMFT, Wyandotte Chemicals Corp., Wyandotte, Mich.

What You Should Know About Radioactive Fallout. Bulletin. 31 pages. Cat. No. FCD 1.2:F19/2. Available from Supt. of Documents, Washington, D. C. Price 10 cents.

Training for Quality Food Preparation. Bulletin, Cat. No. FS 5.123:261. Available from Supt. of Documents, Washington, D. C. Price 20 cents.

Civil Defense Information for Food and Drug Officials. A Book. U. S. Dept. Health, Education, and Welfare, Food and Drug Administration, Washington, D. C. Price not stipulated. June 1955.

Fish Saving. A book. 372 pages. Philosophical Library, Inc., New York, N. Y. Price $12.00.

Processing Power. 16 mm sound film in color, 30 minutes. A picture of modern poultry plant processing layout and operation. Available from Gordon Johnson Co., 2519 Madison St., Kansas City, Kan.

Cleaning and Sanitizing Methods for the Meat Packing Plant. Free bulletin available from the American Meat Institute, 59 E. Van Buren St., Chicago 5, Ill.

1. Nursing Bottle Sanitation; 2. Modern Dishwasher Sanitation; 3. Sanitation in the Poultry Industry. Free bulletins available from The Klenzade Products, Inc., Beloit, Wisc.

Temperature — Its Measurement and Control in Science and Industry. Book by H. C. Wolfe. Vol. 2. 467 pages. Reinhold Publishing Co., New York, N. Y. Price $12.00.

QUESTIONS AND ANSWERS

Note: Questions of technical nature may be submitted to the Editorial Office of the Journal. A question in your mind may be in the minds of many others. Send your questions in and we will attempt to answer them.

QUESTION:

Please give me a general description of the "quats".

ANSWER:

The quats are the quaternary ammonium compounds. This can be explained as follows: The formula for ammonium chloride is NH_4Cl, and when this is dissolved in water it splits apart, or ionizes, into the NH_4 (ammonium ion) and Cl (chloride ion)). The NH_4 ion has a positive electrical charge and is called a cation, while the Cl has a negative charge and is called an anion. Through a series of chemical reactions the four hydrogens (H_4) of the NH_4 can each be replaced by another group thus making the N part of the molecule very large. It will have a positive charge and is therefore still a cation. This new compound is called a quaternary ammonium compound, from the Latin "quaternarius" meaning, consisting of four each, or containing four. Thus a "quat" is a compound in which the four hydrogens of the ammonium cation have been replaced by four groups.

The groups used as replacements are organic (organic chemistry is the chemistry of the carbon compounds). Some of these are very long, having as many as eighteen carbon atoms strung out in a straight line. One of these is known by the trade name as Roccal. The chemical name is alkyldimethylbenzalkonium chloride.

Generally speaking, the quats are good germicides, but there are some things with which they will not mix. One of these is soap, since soap ionizes to form a large anion, which has a negative charge. This is attracted to the large cation of the quat to form a precipitate. Hence if a quat is used to disinfect something which has been cleaned with soap, one must be sure that the soap is thoroughly rinsed off before the quat is applied. Otherwise the quat might be inactivated and a false sense of security might result. The maximal germicidal effectiveness of the quat is attained only on a chemically clean surface.

The 1953 Milk Ordinance and Code of the U. S. Public Health Service gives a clear description of the use of quats on page 180 of Appendix F. This is known as Public Health Service Publication No. 229 and may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. for one dollar. It not only discusses the effects of water hardness, but also describes four different quats by their chemical names. Copies of this Ordinance and Code should be available in all Health Departments.

QUESTION:

Is there a danger that cooling of milk is being overemphasized at the expense of sanitary milk production and handling?

ANSWER:

With reasonable care, milk can be produced with counts not exceeding 10,000 per ml. Cooling in farm bulk tanks practically eliminates bacterial growth, and producers soon discover they can be less careful and still meet existing bacterial standards. In a paper in the Canadian Journal of Public Health, August 1948, it is suggested that samples be held at 55°F. for 18 hours before testing. This allows the growth of most contaminants and thus helps to distinguish between carefully produced milks and those where faulty practices are masked by efficient cooling.

QUESTION:

How valuable are caliform counts on (a) raw and (b) pasteurized milks?

ANSWER:

Coliform counts on raw milk have not been widely used in North America, principally because of the difficulty of differentiating between heavy initial contamination and subsequent growth. With efficient cooling, this test will have increased usefulness. In Britain, some authorities believe it gives the best indication of cleanliness in milking, and in Scotland freedom from coliforms in 0.01 ml. is required. The Dahlberg study (1953) also showed lower coliform counts where udders were well cleaned.

Coliform organisms are killed by pasteurization. Their presence in pasteurized milk indicates re-contamination and a potential health hazard, for disease producing organisms could also have entered the milk. A well-run plant can consistently meet a standard of freedom from coliforms in 1 ml. portions; one large Danish plant meets this standard after incubating samples at 63°F. for 24 hours! Even small numbers of coliforms — less than the 10 per ml. permitted in the Standard Milk Ordinance — indicate that something is wrong, and should not be neglected.

QUESTION:

Should milk standards include a maximum permissible leucocyte count?

ANSWER:

Yes. Milk is defined as coming from healthy cows. Such milk contains relatively few leucocytes, although the numbers increase in late lactation. Opinions differ regarding an acceptable limit, but most authorities agree that over 500,000 per ml. indicate an abnormal udder condition. If a maximum

count limit were established, more attention would be given to the control of mastitis. This should result in a more acceptable, better flavored milk supply, as well as reducing the losses suffered by milk producers.

DANGERS OF AIR POLLUTION TOLD AT NATIONAL CONFERENCE

Washington, D.C., was the site of the National Air Pollution Conference held November 18-20, 1958. Some seven hundred persons representing federal, state and local public health and air pollution control personnel, industrialists, research scientists, educators and others attended. The Conference was called by Surgeon General Leroy E. Burney.

The program was arranged in such a way that six discussion groups operated simultaneously. Each discussion group explored a separate phase of the air pollution problem. Six to nine panelists presented prepared remarks at sessions of each of the six groups. Ample opportunity was given for questions and discussions from the floor.

While the proceedings of the Conference will be published and made available to all conferees and others interested, a recap of some of the facts disclosed and some of the problems involved should prove of interest.

Polluted air may be an often overlooked cause of sickness and death. Recent investigations are strengthening beliefs, as yet unproved, that pollution of air increases the incidence of cancer of the respiratory tract, including the lung and esophagus. Circulatory ills too may show a tie in with polluted air. Studies show that lung cancer death rates in large cities are twice as high as those in rural areas. Cancer can be produced in test animals from concentrates removed from city smog.

Irritant gases and toxic substances in the air are known to make breathing more difficult. Sulphur dioxide is in this category. Ozone, another irritant gas found in community air, can cause scarring of lung tissue in animals and can produce pulmonary edema. It is known that a considerable amount of pollution from air is swallowed. Many persons made ill during acute air pollution episodes reported acute gastrointestinal symptoms.

Exhaust fumes from trucks, busses, cabs and passenger cars contribute materially to the total air pollution problem, especially in congested metropolitan areas. A finger of accusation was pointed at the automobile industry for failure to assume responsibility and take steps necessary to curtail auto exhaust fumes. A representative of the Automobile Manufacturer's Association said the industry is now testing exhaust fume neutralizers but was not yet prepared to say when any commercially acceptable device might be ready. One currently under trial weighs ninety pounds and costs about $150. The problem of exhaust fume pollution becomes quite startling when it is shown that one out of every fourteen gallons of gasoline put into the tanks of the nation's 70 million motor vehicles goes into the air as pollution.

Air pollution problems in the future may be more of a challenge than those of the present. Most of the things which are now accepted as being responsible for community air pollution may get worse in the near future. Estimates indicate our population by 1970 will be 220 million. Our industrial output will rise accordingly. This means more burning, more combustion, more fumes from stacks, more automobile exhaust fumes and an increasingly serious air pollution situation. There are 174 metropolitan areas in the U.S. now and these occupy but one and a half to two percent of our whole land area. There is no indication that crowding and congestion in these areas will decrease. Currently the trend is toward larger metropolitan populations. By 1970 about two thirds of our population will be concentrated in these large centers. Air pollution, unless curtailed more effectively than at present, will effect more of our population and hence will become an even more pressing public health hazard.

The total pollution content of air is not now known. Toxic substances, fumes, gases, aerosols and smoke may and do change in chemical composition when released into the atmosphere. While instrumentation has greatly improved, more sensitive instruments must be devised to obtain a more complete picture of just what is in the air. In addition, the amount of basic research is very limited and rather localized to those areas where the situation has become suffeciently acute that the citizenry has demanded concerted action.

While air pollution has national implications, the best control is that exercised at the local level. Types of pollution vary from one community to the next. Location, weather, topographical features, and the kinds and amount of industry must be considered as variables. The Conference was unaminous in its expressed opinion that much more must be known about air pollutants, more epidemiological work must be carried on to more firmly establish the influence of pollution on health and that present research, while sound and productive, is far to meager both in amount and scope.

Finally, when the public is brought to realize the importance of clean air, and is willing to have something done about it, the pace of research and air pollution control will be markedly accelerated. Earlier

precedents have shown this to be true. Past problems of milk, food, drugs, and the disposal of community wastes have been reasonably well controlled with progress still continuing. The time has now arrived to apply the same basic principles to a clean up of our air supply. *Free as air,* is a commonly heard expression. But how free is it and how clean do we want it? This is a question that now needs a forthright answer.

AT LAST — A FOOD ADDITIVES LAW

By far the most significant piece of legislation in the past 20 years affecting the sciences and industries responsible for our food supply, was enacted when President Dwight D. Eisenhower signed the Food Additives Amendment of 1958 on September 6th. Officially known as Public Law 85-929, it will control the use of any substance which, intentionally or incidentally, may become incorporated into or affect the characteristics of foods. The subject of prolonged discussion, deliberation and debate, and many days of Congressional hearings, the Act represents a substantial improvement over existing law from the standpoint of public health, industrial progress, and government enforcement. The new statute appears to be reasonable and practicable despite the fact that some groups may find certain features not entirely to their liking. It has been indicated that Congress intends to keep a watchful eye on the operation and administration of this amendment and will consider such further changes as may be in the public interest.

Because of the momentous importance of this enactment for the advancement of food technology, it merits careful consideration by scientists, production supervisors, and executives not only in the food industries but in the chemical, packaging, warehousing, and transportation industries.

The regulations under this Act are presently being drafted by the Food and Drug Administration. A conference under the joint sponsorship of FDA and the Food Law Institute, to be held in Washington on November 24 and 25, will be focused on scientific, industrial and regulatory aspects of the new legislation.

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3-A SANITARY STANDARDS COMMITTEES TO MEET IN FEBRUARY

Meetings of the 3-A Sanitary Standards Committees will be held at the Hotel Georgian, Evanston, Illinois, February 24, 25, 26, 1959.

Tentatively, the following agenda items are planned for this meeting:

SSS-DIC

(1) Rubber Standard
(2) Plastics Report
(3) Farm Tanks Amendment
(4) C-I-P Farm Lines
(5) Batch Pasteurizers

CSP-USPHS

(6) Automatic Venders
(7) Air Under Pressure
(8) Ice Cream Freezers

JOINT SESSION

Farm Tanks Amendment
Possibly (6) or (7), above.

If there are points concerning any of the equipment or components listed above which members and others wish to call to the attention of the Committees, a communication should be addressed to:

D. H. Williams, Secretary
3-A Sanitary Standards Committees,
1145 19th St., N.W. Washington, D.C.

BOOKLET AVAILABLE ON OPERATION AND SANITATION OF MILKER SYSTEMS

A new 24 page brochure entitled "Planning for the Installation, Operation and Sanitation of Pipeline Milker Systems" is being made available by The Diversey Corporation of Chicago.

This technical bulletin, covering the basic causes of unsatisfactory pipeline milker operations provides information and suggests solutions for existing problems covered.

It emphasizes the importance of those conditions which have been found to be necessary to the satisfactory maintenance and sanitation of pipeline milker systems.

The booklet will be of special interest to everyone engaged in the Dairy-Farm Industry and is being distributed without cost to those interested in the subject matter by Diversey, world-wide manuacturer of chemical products and detergents for industrial use.

Copies may be obtained by writing to:

The Diversey Corp.
1820 Roscoe St.
Chicago, Ill.

AIR POLLUTION INSTRUCTION OFFERED AT UNIVERSITY OF NORTH CAROLINA

The Department of Sanitary Engineering, School of Public Health, of the University of North Carolina has initiated a course plan in air pollution at the graduate level. This is incorporated into curricula leading to three degrees at the master's level; Master of Science in Sanitary Engineering, Master of Science in

Public Health, and Master of Public Health, and for those who demonstrate capability is part of a plan for advanced study leading to the Doctor of Philosophy.

The Graduate Administrative Board of the University has established three new courses being offered this academic year in air hygiene and air pollution control under Dr. Lyman A. Ripperton. These courses are "Fundamentals of Air Hygiene," "Effects and Measurements of Air Pollution," and "Control of Air Pollution." These may be combined with courses in occupational health and industrial hygiene to prepare for professional development in those phases of environmental health. Laboratory facilities and equipment for student work and for individual research have been greatly increased.

Initiation of this program was made possible through a Community Air Pollution Training Grant to the University of North Carolina by the U.S. Public Health Service. There are graduate assistantships, traineeships, and staff positions available for qualified persons. Inquiries should be to Professor Emil T. Chanlett, Department of Sanitary Engineering, School of Public Health, University of North Carolina, Chapel Hill, North Carolina.

WISCONSIN TO HOLD DAIRY CONFERENCES

Two dairy industry conferences have been scheduled at the University of Wisconsin in January in conjunction with 1959 Farm and Home Week.

The Wisconsin Dairy Manufacturers' Conference will be held Jan. 28-29. The Dairy Fieldmen's Conference will be held the afternoon of Jan. 29 and the morning of Jan. 30.

The manufacturers will discuss selling nonfat dry milk, dairy technology and product accountability, enzymes and heat treatments of market milk, functions of electronics, additives in the ice cream industry, and mechanization of cheese making.

The fieldmen will consider farm inspections, quality control with bulk tank milk, and new methods of measuring milk quality for intra-state shipments.

Speakers from different parts of the country will appear at the programs. The Wisconsin Dairy Technology Society will hold a dinner meeting Jan. 29.

LOS ANGELES CITY SANITARIANS GET BOOST IN SALARIES

Effective December 1, 1958, Los Angeles City Sanitarians will receive an 11% increase in salary. This will place the Sanitarians' top step at $575.00 per month.

An interesting note is that 5½% of the increase was based on the cost of living index; the other 5½% was given as an inequity adjustment based on the increased educational requirements now in effect. —Southern California Chapter *Newsletter*, California Association of Sanitarians, November, 1958.

STUDY OF GREASE FILM ON DISHES TO BE MADE

Woman's oldest drugery and man's newest atomic research techniques will be combined in a three-year project just starting at The University of Michigan School of Public Health.

Researchers will smear quantities of dishes with radioactive bacteria and kitchen greases, then put them through ordinary cleaning and washing processes.

Their goal is to learn the health hazard of the invisible "grease film" that sticks to household dishes and untensils despite repeated washing.

Housewives know the film as an annoying blur that clings to glassware and dishes and makes them feel slippery after even the most thorough cleaning. It is often blamed on "soap stain" or chemicals in the water," but the U-M researchers say it is neither.

According to Edward H. Armbruster, principal investigator on the project, the film "consists of various vegetable and animal greases, thin as fingerprint." Ordinary household cleaning merely spreads the film over the surface.

One simple test for grease film is to wet the article with clear water. If the water forms into droplets that cling to the sides, a grease film is present. If the glass or dish is perfectly clean, the water will sheet off evenly.

While the film itself is harmless, Armbruster says the danger lies in its ability to trap and shield bacteria through repeated washings.

He and Prof. Gerald M. Ridenour of the U-M Department of Enviromental Health will explore this protective function of the grease film, and will seek new ways to remove it from typical home and restaurant equipment. Their study will include dishes and utensils made of china, plastic, steel, glass and alumnium. Three additional research specialists will be employed on the project.

In the first stage of their work, they will soil various kitchen articles with radioactive tallow, cooking oils and animal fats. At each stage of the washing and cleaning process, the researchers will measure the radiation to learn the amount of grease film remaining.

Later, they will contaminate hundreds of dishes and glasses with radioactive Staphylococcus aureus, and again put them through routine washings. A similar radiation count will then determine how many organ-

isms are present on seemingly "clean" dishes.

The project is being supported by a $60,000 grant from the U.S. Public Health Service.

"The information obtained from our study," Armbruster said, "will be applicable to homes, restaurants, bars and food processing plants."

LETTERS TO THE EDITOR

Note: The two letters reproduced below are both interesting and of good general interest.

Cochabaniba, Bolivia, S.A.
November 18, 1959

Dear Red:

I am enclosing a check for ten dollars ($10.00) for two year's dues. Please check up and see if you have a record that I paid for 1958. If I didn't here it is and if I did I will be paid up for 1960 too. At any rate thanks for sending the Journal which arrives here after a trip that takes approximately two months.

Due to various delays and red tape the milk plant here will not start operation for at least six more months. Most of the processing equipment is here and installed, but some essentials still have to be bought and it will take at least six months to get them here.

While waiting for the development of this project, I have been acting as Director of the largest Agricultural Experiment Station in Bolivia. I have a staff of about 15 Bolivian technicians, all of whom are college graduates and several of whom have spent a year or more in the U.S. on scholarships. They are good people to work with and I find it very interesting. In addition the La Paz headquarters has me acting as Area Coordinator for this District so I have no trouble keeping busy.

I have only about 11 months left of my second two year tour so will not get to help with the milk plant very long before it will be time to leave as ICA usually moves people after four years in a place. I hope someone is sent to replace me as I am sure the plant should have an advisor for at least a couple of years.

Please accept my very best personal regards.

Sincerely,
/s/ H. B. (Hank) Morrison
(Formerly Professor Dairy Science Dept.,
University of Kentucky)

November 24, 1958

Dear Dr. Olson:

An interesting episode involving the use of pesticides was recently brought to our attention. A farmer in the Orange County New York area rented some pastureland which he used for grazing a few heifers. Adjoining this land was an orchard also owned by the man who owned the pasture. He sprayed the orchard with Endrin (a chlorinated hydrocarbon type of pesticide) to exterminate field mice which were damaging the trees. Shortly after the spraying heifers broke into the orchard. Four of them were poisoned and one died immediately. The other three were saved as the result of a call by the County Agent to the Director of our New York City Health Department Poison Control Center. The Director was able to give the County Agent the name of an antidote which was used by the veterinarian to save the three heifers. Fortunately no milking cows were grazing anywhere near the orchard.

This incident would seem to provide us with a good deal to think about:

1. It illustrates quite vividly the truth of the old adage, "Good fences make good neighbors".
2. The value of our Poison Control Center was highlighted as was the efficiency of the County Agent who knew where to look for help.
3. It makes clear to farmers the responsibility they have to make certain these pesticides are used not only according to direction but in such a manner that they do not endanger the lives and property of other people.

These observations are of course not original but if the agricultural use of pesticides is to remain an accepted and expanding practice it is our responsibility to emphasize the need for care and judgment in their application.

Very truly yours,
/s/ Walter Grunge, Chief
County Milk Section
N.Y.C. Health Department

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RAPID-FLO CHEESE CUPBOARD DRAWS 3,000 IN CHICAGO

Nearly 3,000 Dairy Industry people, who know good cheese when they taste it, sampled and savored more than 1,600 pounds here in four days.

They were guests at the traditional "Cheese Cupboard" sponsored by the Filter Products Division of Johnson & Johnson, makers of Rapid-Flo milk filters.

The Dairy Industry groups were meeting concurrently in Chicago (Dec. 8 - 13) in conjunction with the 21st Dairy Industries Exposition.

For months, the Filter Division personnel have been carefully selecting and purchasing some of the nation's finest cheeses. The impressive display was gathered from 32 cheese-making states, and included more than 50 varieties.

Johnson & Johnson set up the Cheese Cupboard in a parlor at the LaSalle Hotel, and issued invitations to cheese lovers to come and sample 'til their heart's delight. The Cheese Cupboard was open for four consecutive nights from 6 to 8 P. M.

A huge red and white canopy covered the buffet tables, on which were spread cheeses ranging from a 200-pound Swiss wheel from Utah, to tiny pound packages of new and unusual cheeses.

Visitors included many leaders of the Dairy Industry, and pretty Carol Ralphs, the reigning American Dairy Princess, of Ferron, Utah.

Shortly before noon on the third day of the cheese smorgasbord, the company dispatched messengers bearing large platters of cheese to the food editor of Chicago's four daily newspapers. For lunch that day, the editors had a wide selection of some of the country's finest cheeses.

Descriptions of the cheeses were included so the epicurean journalists could describe them to their readers.

Rapid-Flo sales personnel awarded the last wedge of cheese to Elmer E. Kihlstrum, Eastern Sales Manager and Product Director, who served as "host" of the Cheese Cupboard since it was inaugurated.

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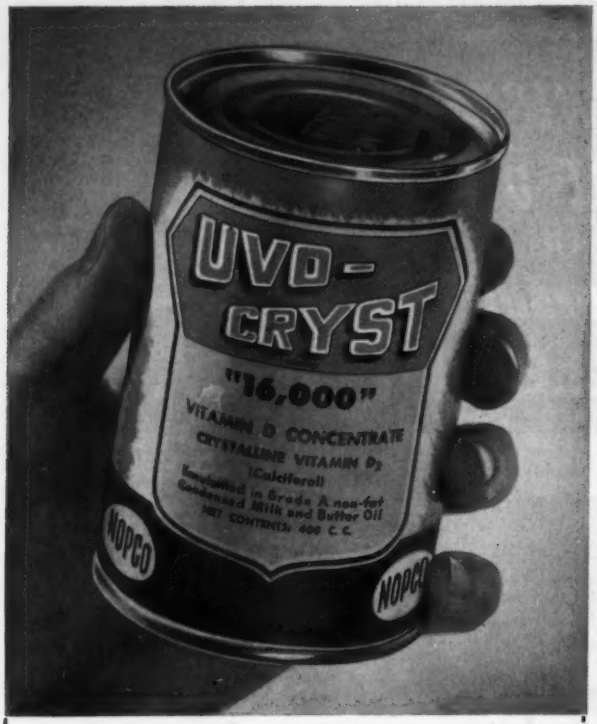

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Steel advertising panels, which provide "weatherproof" messages on Weathermaster waste receptacles, have just been introduced by John Wood Company's Superior Metalware Division. The new full-length advertising panels are designed for indoor or outdoor use. The message stays attractive under all conditions.

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Announcing the new stainless steel advertising panels, C. P. Carlson, Superior's General Sales Manager, said they had produced exceptional results in test locations both indoors and outdoors. Chambers of Commerce can use the indestructible panels to appeal for public support of clean-up or other civic campaigns. Advertising executives have found the Weathermaster panels ideal for point-of-purchase and on-the-street messages to sell goods and services.

Additional information can be obtained from Superior Metalware Division, John Wood Company, 509 Front Avenue, St. Paul, Minn.

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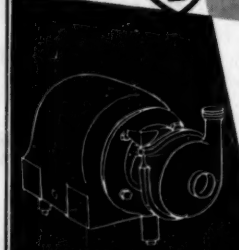

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